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# SCIENCE NEWS LETTER

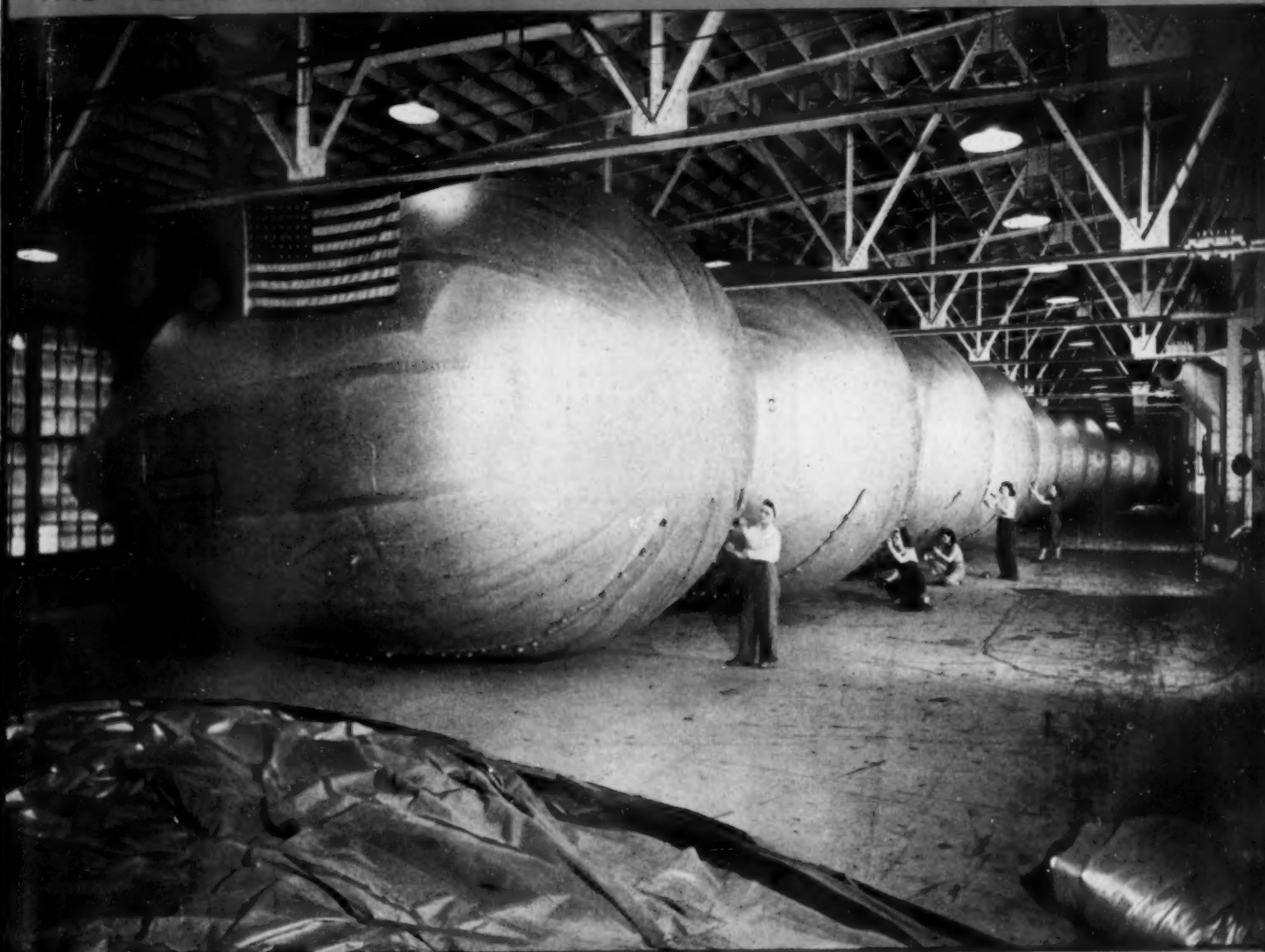
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JUL 27 1943

DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE

• JULY 24, 1943



For Ship Protection

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A SCIENCE SERVICE PUBLICATION

# Do You Know?

Latin-American countries are increasing their food production as a contribution to the war effort.

Berries should not be hulled, crushed, sliced or juiced until just before serving, or their vitamin C will be lost.

Over a third of the men and women employed in May were 45 years of age or over, the U. S. Employment Service states.

Dried skim milk, formerly used extensively by poultry and livestock farmers, now is largely diverted to human consumption.

State gasoline taxes produced 11% less revenue in 1942 than in 1941; for January, 1943, they produced 34% less than in January, 1942.

Beryllium combined with copper makes an almost ideal material for springs for electrical instruments because of its exceptional strength and corrosion resistance.

Close-grained gray iron is the most widely used material for piston rings because it withstands wear and retains its physical properties under temperature, pressure and lubrication changes.

The United States is furnishing funds and technicians to assist in the establishment of 30 hospitals and health centers distributed from Guatemala through Central America to the headwaters of the Amazon, the Brazilian rubber country.

## SCIENCE NEWS LETTER

Vol. 44 JULY 24, 1943 No. 4

The weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C. NOrit 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$7.00; 15 cents a copy. Back numbers more than six months old, if still available 25 cents.

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Cable address: Scienservice, Washington.

New York office: 310 Fifth Avenue, CHickering 4-4565.

Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark.

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Approximately 8% of all Canadian women from 15 to 54 years of age are employed in war industries.

Federal and State officials are making plans to increase oyster production as the present production is only one-half that of 50 years ago.

Only female mosquitoes bite to suck blood; the males get all their nourishment from plant sap.

One American airline company finds that only one passenger in 1,000 suffers from air-sickness and only one in 1,800 has ear trouble.

mark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

The Science Observer, established by the American Institute of the City of New York, is now included in the SCIENCE NEWS LETTER.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566; and 360 N. Michigan Ave., Chicago, STate 4439.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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## CHEMISTRY

# Rubber Output Speeded

Putting things in a ferment is how a bacterium, whose real name is a secret, helps speed synthetic rubber production for the allies.

► THIS is really the story of a war worker who specializes in putting things in a ferment and thereby helps win the war. His name is a secret because he is engaged in important chemical undercover work. He is a bacterium, a little active organism whose great multiplying virtue is that he makes possible the production of one of the two main ingredients of synthetic rubber Buna S.

Suppose we call him "Buty" because he makes possible the making of butadiene from the starch of grain. "Buty" works at the Schenley Research Institute of Lawrenceburg, Ind., eliminating the usual need of first making alcohol in the manufacture of butadiene.

Early work on the butadiene short-cut process began at the Iowa State College and Northern Regional laboratory of

the U. S. Department of Agriculture at Peoria, Ill. Government and industrial laboratories have pooled their research findings.

The special bacterium ferments the grain mash to form a glycol called butanediol, which is then esterified and then "cracked" by heat to form the butadiene. This, combined with styrene, another chemical made from petroleum, gives the principal synthetic rubber.

Not more than a quarter of the post-war rubber will come from tree-grown natural rubber, Dr. A. J. Liebmann, director, Schenley Research Institute, predicted in explaining that the present pilot plant, producing about 5,000 pounds of butadiene a week, is just a beginning of faster and more economical synthetic rubber production.

*Science News Letter, July 24, 1943*



**BACTERIAL WORKER**—Here the anonymous bacterial war worker goes on the job as a "new shift" is dumped into a tank. The workman on the right stands by with sterile cotton and chemicals to prevent infection of the bacteria. In the tank, the bacteria will multiply thousands of times and then will be added to grain mash to convert it into butanediol, intermediate step in the production of synthetic rubber.

## BACTERIOLOGY

# Penicillin Grown Faster

Vinegar-making process using tall cylinders filled with wood shavings is adapted for the large-scale production of important mold growth.

► PENICILLIN, the germ-killing drug produced by one kind of common mold, can be turned out on a relatively large scale by an adaptation of a process long used for making vinegar, states Prof. C. E. Clifton, Stanford University bacteriologist (*Science*, July 16).

In the so-called "quick" method for producing vinegar, a tall cylinder is filled with wood shavings on which a mass culture of acetic acid bacteria is induced to grow. Cider, wine or some other weak solution of alcohol is trickled down through the shavings, while air is seeped upward. Vinegar comes off at the bottom.

Prof. Clifton has set up several such columns in his laboratory, making them out of rubber and glass, so that everything can be thoroughly sterilized before operations begin. One difficulty in penicillin production seems to be interference from bacterial contamination.

It was also found advisable to use rather coarse shavings, to prevent clogging and enable the air to pass upward readily.

The shavings were well wetted with a food solution consisting of 4% glucose and 0.1% yeast extract in water, then "planted" with spores of the mold, *Penicillium notatum*. After 24 hours the nutrient solution was slowly dripped in at the top and permitted to trickle through.

The liquid coming off at the bottom was tested on cultures of *Staphylococcus aureus*, the germ responsible for common boils, one type of food poisoning, and a particularly dangerous kind of blood infection. Its ability to kill "staph" germs compared very favorably with that of penicillin produced by the slower, more laborious method which has been in use heretofore.

*Science News Letter, July 24, 1943*

## ANATOMY

# Lack of Anatomical Chart Fails to Stump Instructor

► A LIEUTENANT instructor was detailed to give lessons in first aid in case of dangerous bleeding from severed arteries, relates the *Infantry Journal* (July). There wasn't any anatomical chart showing the location of the blood vessels, such as every well-equipped schoolroom can display before its pupils.

The young officer was nothing if not ingenious. Singling out a long, lean soldier from his class, he ordered him to strip. Then with a piece of lipstick he traced the human arterial system on the private's goose-pimpled hide. With such a large-as-life-and-twice-as-natural chart, the lesson was a great success.

Now lipstick is standard equipment in that outfit.

*Science News Letter, July 24, 1943*



## GEOGRAPHY

# Sicily Is Mountainous

Mountains lie close to the zig-zag Sicilian coast line with its good harbors and landing beaches, forming a natural fortification within the island.

► **ALLIES LANDING** on Sicily faced an up-hill fight. The topography of Sicily is discussed in the *Field Artillery Journal* (July) by Col. Conrad H. Lanza.

The zig-zag coast line, measured around all inlets, is about 1,700 miles in length. The straight-away distance across the north side of the triangular island, from Messina to Trapani, is approximately 170 miles. From Trapani the straight-away distance along the west coast is about 30 miles; the south or southwest coast extends 170 miles, and the east coast extends 125 miles from the southeast corner of the island back to Messina.

On the north shore there is an excellent harbor at Palermo and a city of 400,000 people, a railroad center for Sicily's extensive narrow-gauge railways. The surrounding plains are not very wide. Milazzo has a good harbor, but limited surrounding plains. Any advance into the interior from these cities would encounter strong mountain positions. Control of these harbors, however, was essential, as was also seizure of the adjacent airfields. From Milazzo land forces could advance around the north and the south sides of the Peloritan mountains on Messina.

Trapani and Marsala, on the 30-mile west coast, have good harbors and good landing beaches. But the invasion of the interior from this area is made difficult by the mountains, Monte Grande, less than 20 miles back from the shoreline.

The best landing beaches for the invasion of the interior of Sicily are reported to be on the southwest and east coasts. Their number is limited and undoubtedly they have been strongly fortified. The mountains and hills along these coasts are not as close to the shore as those in the north; they are not so high and are more easily crossed.

Once in Sicily the Allies found many good hard-surfaced roads built with a local asphalt. They are too narrow for the most effective military traffic but will prove very useful. There are very few rivers to cross. The climate is generally mild so military operations can be conducted at any time. Summer days

may get excessively hot. Rainfall is scanty.

For many centuries the inhabitants of Sicily have lived in towns, rather than on farms or in rural villages. This was because of the fear of attack by enemies in the frequent wars during the Middle Ages.

Houses are built of stone. They are easily converted into military obstacles and may delay advancing troops to a considerable extent. With a total population in Sicily of about 4,000,000, these towns are plentiful.

While much opposition was to be expected at the good landing beaches, one factor was very favorable to the Allies. Landing operations need not wait the turn of the tide, as the Mediterranean has no tides.

*Science News Letter, July 24, 1943*

## PHYSICS

## Cloud Chamber Is Used To Catch Germs for Count

► **GERMS** floating in air can be downed by using the Wilson cloud chamber, then counted and identified, Prof. Carl E. Nielson of the University of California told the meeting of the American Physical Society.

Here is how it's done: As a piston in the box-like chamber is suddenly moved in such a way as to increase the volume, the air expands to fill the increased space. When a gas thus expands, temperature goes down. This causes the moisture in the air to condense onto the germs—or condensation nuclei, as the scientist terms them. The dew-laden germs then sink to the bottom of the chamber where they are caught in a dish.

Suggesting the new technique as another possible use of the cloud chamber which is ordinarily used to study ions, Prof. Nielson pointed out that most methods of air sampling remove an unknown percentage of the germs; the cloud chamber downs them all.

Experiments conducted by Prof. Nielson show that dust particles of germ size also serve as condensation nuclei when the air is slightly supersaturated with moisture.

*Science News Letter, July 24, 1943*



**MERCURY LAMP**—Scarcely bigger than a wooden match, this small mercury lamp developed by the General Electric Company is good for one million photographic exposures.

## GENERAL SCIENCE

## Research Problems Listed For the Young Scientist

► **A WORLDFUL** of research problems awaits youthful scientists, Dr. Colin Garfield Fink of Columbia University declares (*Science*, July 9), listing six to challenge those of vision and courage:

1. Perfection of electric lighting 10 times as efficient as any present type.
2. An improved automobile gas engine operating at three or four times the efficiency of the present one.
3. A paint for wooden structures that is rainproof and sunproof.
4. An alloy of aluminum as resistant to fatigue as steel.
5. A metal or other material to take the place of our rapidly dwindling resources of copper or of lead.
6. A material to take the place of leather for shoes with all the good, or even better, qualities of leather.

Stating that "the chances of finding new products and new processes have never been equalled in the past," Dr. Fink recommends radical research to America's youthful scientists.

To show the difference between radical or fundamental research and development research, Dr. Fink cites the production of billiard balls out of plastic in place of elephants' tusks as a discovery radically different from anything that has gone before. Development research might try to raise more elephants or try to develop longer or bigger tusks through changes in diet.

*Science News Letter, July 24, 1943*

PHYSICS

# Speed Pictures by Flash

A "still" photograph of a wheel revolving at 70,000 revolutions per minute can be taken with a new, easily portable mercury flash lamp outfit.

► A NEW compact high speed electronic light unit has been developed by the engineers of the General Electric Laboratory, with the direction of S. Lawrence Bellinger, which can take photographs with an exposure of only one-millionth of a second. High speed photographs taken in recent years are only one thirty-third as fast as this new unit.

A portable box 10 inches square, weighing under 20 pounds and containing a mercury lamp about the size of a cigarette constitutes the entire device. The light source on the front of the box resembles an auto headlight and can be operated either manually by means of a push button, by electrical contacts or by a phototube and preamplifier. It will illuminate an area of twenty square feet with sufficient light intensity to photograph the fastest moving objects.

Some features of this new high speed unit are its standard replaceable electrical parts, together with one electronic tube and a 100-watt Mazda mercury

lamp. It can be operated on an ordinary 115-volt alternating current household lighting circuit. The current is rectified by an electronic tube and then used to charge a capacitor which serves as a sort of electrical storage tank. There is enough power accumulated in three seconds to operate the lamp at full intensity. The energy used in each flash is so slight that it is only sufficient to light a 40-watt lamp one-tenth of a second. The small mercury lamp has a life value of one second, which makes it good for one million exposures. This would be equal to 500 years of an average newspaper photographer's work. Lamps of this type are now being used as high-intensity light for illuminating airports, television, motion picture studios and various other means.

Although complete experimental tests have not been made, due to the pressure of war work, photographs have been taken of high-speed machinery such as turbines and supercharger parts. A "still" photo of a wheel revolving at 70,000 revolutions per minute has been taken with this new device.

*Science News Letter, July 24, 1943*

PUBLIC HEALTH

## Keep Ham In Refrigerator To Avoid Food Poisoning

► BE SURE to keep the ham in the refrigerator, if you want to avoid having yourself, your family and guests get sick with food poisoning or ptomaine poisoning as it used to be called. Food poisoning rarely kills anyone, but it is most unpleasant and may be so weakening that the victims lose considerable time from work.

Probably the most common cause of food poisoning is the staphylococcus, a germ which is also familiar as the cause of boils. When these germs get into food they can, under suitable conditions, produce a poison which will sicken the person eating it or food containing it. You cannot tell from either the taste or smell when ham has this poison in it.

Staphylococci are very common germs, found on fingers, hands and in the air, so it is almost impossible to keep some

of them from getting into food. It is quite possible, however, to prevent the conditions that lead these germs to produce their poison in the food. The chief measure for controlling this situation is keeping food at low temperatures until it is to be cooked and eaten.

Ham and tongue come right after custard-filled bakery goods in the number of food poisoning outbreaks caused. The rapidly cured, pre-cooked, and ready-to-eat hams now on the market are particularly dangerous. These are safe when they leave the packer, but the danger is that so many people fail to realize that they must be kept really cold in the refrigerator.

Ham sandwiches made from ham that had been subjected to a tenderizing process caused an outbreak of food poisoning among patrons of an upstate New York restaurant recently, the state health department reports. Those who ate the ham the day it was cooked escaped. But the next day the restaurant's mechanical refrigerator broke down. Even though two large pieces of ice were put into it, it apparently was not cold enough to keep the ham from being poisoned by staphylococcus germs.

*Science News Letter, July 24, 1943*

AERONAUTICS

## New Process Shortens Time For Doping Plane Surfaces

► NEW LACQUER and a process for pre-treating fabric are expected to speed "doping" of plane and glider surfaces by nearly a third. This time-saving team is a duPont development now in production.

In the past, vast amounts of special cotton fabric have been transformed into a taut and tough outer hide for training planes and gliders by stretching the cloth over the aircraft framework and applying dope with brush and spraygun plus laborious sanding.

Now the plane fabric can be pre-treated before shipment to the plane plant. Use of the method permits scarce solvents to be reclaimed and used over and over. Some of the subsequent doping and sanding is eliminated.

Pre-doping can be coupled with the new type of lacquer, which contains a fifth more film-forming solids than had been practical heretofore. All slow paint brush work has now been replaced by high-speed spraying, the company reports, and the lacquer still further reduces the number of coats needed to finish a plane.

*Science News Letter, July 24, 1943*



**FLASH PHOTOGRAPHY**—The inside of a portable millionth-of-a-second flash light for photography is being shown by S. L. Bellinger, a General Electric engineer. The phototube accessory equipment which may be used in fast operation of the light is held in his left hand.

## BIOLOGY-PSYCHOLOGY

# Hand and Head a Unit

An understanding of the interdependence of mind and body in performing the world's work is necessary to solve present labor difficulties, leading biologist says.

► IF EVERY labor leader as well as every manager of industry realized that the hands that do the work and the minds that also work and plan are parts of the human body that depend upon each other, present labor difficulties would come closer to solution in the opinion of Dr. William E. Ritter, Emeritus Professor of Biology of the University of California and Honorary President of Science Service.

"The present serious outbreak of labor troubles must depend in part for its remedy on education, regardless of what may be undertaken by legislation and other political means," Dr. Ritter said. "As the discussions of the ideals of unity have been carried on, these refer to social, national and international unity. But from the educational point of view, perhaps the most important thing is the unity of the individual himself. No aspect of this is more crucial than that

of the age-old disruptive duality of mind and body. So far as philosophy and theology are concerned, the individual is a house divided against itself. Psycho-biology calls attention, however, to the fact that mind and body, with hands as a climactic aspect of the body, form a unity of such a nature that the attempt to separate them can result in nothing less than intellectual and spiritual disintegration.

"If every person who should become a leader in industrial labor were to be adequately conscious of what he and every one of those whom he leads really is—a unit—his attitude would be quite different from what is now being manifested in labor troubles. This would be equally true of owners and managers of the industries. It appears that there would be a basis for the leaders of the two aspects to get together for considering their mutual interests and their dis-

agreements. The meliorating conditions would not be applicable only to economic problems, but to all political organization and effort so far as government has to do with economic and industrial matters."

Dr. Ritter explained that recent investigation in psycho-biology has shown that the cooperative activity of all the most important parts of the organism, head and hands with the rest, has a scientific basis. If we had not human brains and mind, we would not have human hands and if we had not human hands we would not have human brains and mind.

The skilled surgeon using his head and hands in combination is just as much a laborer as the man or woman who works as a mechanic in the production lines of bombers and tanks and other machines. Dr. Ritter pointed out that both of them would be unable to do their tasks in life if it were not for the fact that they use their heads and hands in combination.

*Science News Letter, July 24, 1943*

## MEDICINE

## Recovery Hastened by X-ray Used on Painful Shoulder

► PATIENTS suffering and disabled with a painful shoulder condition technically called acute subdeltoid bursitis can be back at work within 48 hours when treated with X-rays, Dr. Arthur A. Brewer of Alton, Ill., and Dr. Oscar C. Zink of St. Louis report (*Journal of the American Medical Association*, July 17).

There is no definite cause for the condition, but overuse and unaccustomed use of the arm are frequently factors. Typists, one authority found, were more often afflicted than clerks.

A typical case reported was that of a typist who had each shoulder involved at different times. On one occasion the condition was treated with diathermy and heat applications. She was completely disabled for a month and was a hospital patient for three weeks. When the other shoulder became involved, she had X-ray treatment and was back at work before the end of 48 hours.

The same results of X-ray treatment of acute bursitis in other patients, the doctors report, are obtained in a high percentage of cases. The pain frequently gets worse during the first eight to 24 hours after the treatment but then promptly grows much less. A sling for the arm and analgesics are therefore given following the treatment.

*Science News Letter, July 24, 1943*



**BETTER MAPS**—The soldier, using photographs made from airplanes, constructs and corrects maps by use of the Abrams Vertical Sketchmaster, which adjusts the pictures to the proper scale.



## ASTRONOMY-PHYSICS

# Keeps Stars Together

**Dynamical friction is largely responsible for the continued existence of galactic clusters like the Pleiades, Hindu-American astrophysicists explain.**

► DYNAMICAL FRICTION is largely responsible for the continued existence of galactic clusters like the Pleiades. It also furnishes a strong support for the short life of these clusters, a life of only about 3,000,000,000 years, points out the Hindu-American astrophysicist, Dr. S. Chandrasekhar, of the Yerkes Observatory. This period of 3,000,000,000 years is about the age of the earth, and therefore this theory has a bearing on the time scale for the universe.

The force acting on a star, believes Dr. Chandrasekhar, varies because of the relative motions between the stars. The period of such fluctuation would be roughly equal to the time required for an average star to cross the average distance between the stars, which is estimated to be approximately 10,000 years. While it would be practically impossible to predict what would happen to a given star, its probable course can be followed.

If a period much longer than the estimated 10,000 years is considered, the change in velocity of a star would be the result of the addition of a large number of such fluctuations. The simultaneous influence of numerous fluctuations acts as a brake upon a star and has a decelerating effect in the direction of motion.

This effect which causes each star to tend to hold back all the other stars is dynamical friction.

"It is friction because it has a decelerating effect on the motion of the star, and dynamical because it ceases to operate when the star is at rest and acts again only when it is in motion," explains Dr. Chandrasekhar.

On account of the fluctuations, stars may be expected to be accelerated beyond the velocity of escape and the rate at which this happens gives a clue to the life of the cluster.

If dynamical friction is ignored, the cluster will disintegrate within 100,000,000 years, Dr. Chandrasekhar believes. But if the frictional term is included, he finds that galactic clusters have lives averaging from 3,000,000,000 to 5,000,000,000 years.

This study into the dynamics of star clusters was presented by Dr. Chandrasekhar at the First National Conference on Physics held in May in Puebla. A number of outstanding American scientists attended the meeting at the invitation of the Mexican President Manuel Avila Camacho and the Governor of the state of Puebla, Dr. Gonzola Bautista.

*Science News Letter, July 24, 1943*

## MEDICINE

# Vein Trouble Forecast

**A war-caused increase in the number suffering from varicose veins is expected. Operation and injection of a chemical to harden the vein is advised.**

► A WAR-CAUSED increase in the number of men and women suffering from varicose veins is forecast by Dr. Gerald H. Pratt, of the New York Post-Graduate Medical School and Hospital of Columbia University, in a report to the *Journal of the American Medical Association* (July 17).

The condition affects women twice as often as men, but in a total war, Dr. Pratt points out, "men are subjected to strains that most of them are ill prepared to stand.

"The long periods of standing, fights through jungles and against icy winds and adaptation to the peculiar position necessary to man tanks, cramped cockpits or fox holes" are likely, in his opinion, to precipitate the development of varicose veins in the future.

Requests for information from the various camps indicate, Dr. Pratt reports, that the armed services are already having experiences with the problems.

Civilians, both men and women, will be more affected than usual because more

of them at older ages will be working at unaccustomed jobs requiring tedious standing, operating unusual pedal apparatus and in general using parts of the body not "acclimated for the strain."

Modern treatment of the condition when the valves in the superficial veins have become incompetent consists in an operation to close off the long vein of the leg, called the saphenous, near its junction with the femoral vein high up the leg, followed by injection of a chemical to sclerose or harden the vein and its branches. Examination six years after such treatment, Dr. Pratt reports, showed good results in a high percentage of patients.

*Science News Letter, July 24, 1943*

## NUTRITION

# Jackrabbit Should be Used To Ease Meat Shortage

► JACKRABBITS are pointed out as a wasted meat resource by B. Ashton Keith, Kansas City scientist. The long-legged, long-eared lopers of the prairies and plains are seldom eaten; though they are killed as range-robbers by ranchers, in great drives that slaughter thousands of them. The carcasses are either left for the crows and coyotes, or at best picked up to be processed into commercial dog food.

Yet, declares Mr. Keith, "Some of the pleasantest recollections of my boyhood are of fried jackrabbit, baked jackrabbit, jackrabbit stew and jackrabbit pie. Those delicious meals that Mother used to cook after we came in from a hunt on the prairies still make my mouth water."

F. C. Lincoln, zoologist of the Fish and Wildlife Service, confirms Mr. Keith's claims for the tastiness of jackrabbit meat if properly prepared. Most people, he thinks, consider jackrabbit unfit to eat because they try to use the same cooking methods with it that they use with the smaller, softer cottontail rabbit of the eastern half of the country. Cook it a bit longer and it will be just as good, he stated, adding, "Personally, I think it's even better than cottontail."

The same precautions against tularemia or rabbit fever must be observed with jackrabbits as with other wild rabbits, Mr. Lincoln warned. Dead rabbits must be handled only with gloves, the fur disposed of in such a way that no germ-carrying fleas can escape from it, and the meat must be thoroughly cooked.

*Science News Letter, July 24, 1943*

## PHYSICS

## Pictures Grow on Film From Tiny Flecks of Silver

► PICTURES grow on photographic films like seeds in a garden throwing out roots. Light, striking the silver salt in the emulsion, causes the formation of "nuclei," which are submicroscopic bits of silver. During development, these stimulate some of the remaining silver to form long, rapidly growing filaments, Dr. T. H. James, of the Kodak Research Laboratories, reports (*Journal of Chemical Physics*, July).

The silver specks act as a catalyst to speed up the chemical process of developing the photos, the scientist believes. At the point of contact between the specks and the silver bromide which coats the film, new silver emerges as long, slender strands. These are true crystals although they grow in only one direction instead of in all directions as many crystals do.

Bromide ions released from the crystals may leave a pitted surface around the growing silver strands. These pits form new centers which send forth new silver filaments. Thus are formed the "sea-weed" clusters observed in electron microscope photographs of developed silver grains.

*Science News Letter, July 24, 1943*

## PUBLIC HEALTH

## Use All Insect Sprays With Greater Care Than Ever

► A DANGER to life and property which is too often forgotten exists in the dusts, sprays and gases used to protect growing fruits, vegetables and field crops from insects and fungi, and stored commodities from insects and molds. The danger this season is greater than usual for two reasons: 1. Large numbers of inexperienced persons may be using some of these fumigants in Victory gardens or on farms where they are working for the first time; 2. Certain chemicals formerly used are now classed as critical materials, making necessary the substitution of more dangerous chemicals, so that even experienced farmers may endanger themselves, other persons and their property.

The health dangers from fumigants are pointed out by Charles M. Ferguson, safety specialist of the U. S. Department of Agriculture, as follows:

Exposure to the fumes and vapors produced by fumigants may kill you if you come up against high concentrations of

them, or even if the concentration is low but encountered over a considerable period of time. Hydrocyanic gas is one of the most efficient fumigants, but breathing even minute amounts of it is usually fatal.

Even if the vapors from fumigants do not kill, they may irritate the lining of the nose, throat and lungs, causing weakness of these parts of the body and greater susceptibility to disease.

Symptoms which appear from contact with poisonous concentrations of vapor may include giddiness, headache, vomiting, difficulty in breathing and lassitude or a tired, peepless feeling. Prolonged exposure may damage internal organs such as the liver and kidneys, on account of the poison taken into the body through inhalation. Inhalation itself may not cause discomfort as some of the poisons have no disagreeable odor. Some have no odor at all.

Improper handling of fumigants in either gaseous or liquid state, through carelessness or poor equipment, may cause skin trouble.

*Science News Letter, July 24, 1943*

## GENERAL SCIENCE

## Industrial Museums Record Role of American Industry

► ACHIEVEMENTS of American industry to help win the war and to push peacetime progress are being recorded in at least 80 company museums, and the movement promises to be widely expanded throughout the country.

Foreseeing the need for hundreds, even thousands, of industrial museums, the American Association of Museums has just issued a report (*Company Museums*), the result of a study supported by the Carnegie Corporation of New York.

Through such collections future generations may piece together the vast record of industry and commerce.

"Now that World War II has overturned the business world, as well as the geographic world," writes Laurence Vail Coleman, author of the report, "there is infinitely more of history that companies are making and that companies alone can adequately record."

"Only through specialized collecting in many different lines can the story be put down fully enough to be clear for the reading of generations to come."

Although museum making is now being held in check by war activities, Mr. Coleman sees signs of rapid expansion of such projects after the war.

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# IN SCIENCE

## MILITARY SCIENCE

## Fishermen Are Warned on Hauling in Derelict Mines

► FISHERMEN are warned by the Navy's Hydrographic Office against their natural tendency to salvage any large cylindrical or spherical objects that might be derelict buoys in normal times but are now more likely to be stray mines or other containers of high explosives.

Some of these objects are doubly dangerous: it's dangerous to haul them in, but more so to let them go again because on sinking a second time they might explode, blowing the small boat out of the water. Finders are instructed to haul aboard any such undesired iron fish as they may catch in their nets or bottom drags, handle them very gently, lash them securely to the deck and bring them as soon as possible to the nearest Coast Guard or Naval station. On no account are any projecting mechanisms to be tampered with.

Objects of this kind found floating on the surface are not to be picked up. Finders are instructed to keep clear, and report location immediately to a Coast Guard or Naval station.

*Science News Letter, July 24, 1943*

## AGRICULTURE

## Tree Seedling Transplanted By Celery-Planting Machine

► MECHANIZED mass transplanting of tree seedlings has been successfully carried out in Michigan, using a machine originally designed for setting out celery seedlings which was slightly modified to accommodate the differently shaped and rooted young trees. During the past season nearly a million and a quarter pine seedlings were set out by the new method, at an over-all cost of 46.8 cents a thousand.

Machine transplanting promises to do a great deal toward keeping up the necessary propagation of new forest stock in spite of lack of labor needed for setting out the seedlings by the old hand method. Each machine is operated by a crew of three, one man and two women.

Details on the new machine and its operation are presented in the *Journal of Forestry* (July).

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## THE FIELDS

### INVENTION

#### Rollers Designed to De-Ice Airplane Leading Edges

➤ A NOVEL ATTACK on the life-and-death problem of icing on airplane leading edges is represented in the device on which patent 2,324,303 has been granted to C. J. Johnson of Encino, Calif., assignor to the Lockheed Aircraft Corporation.

Present de-icers, the inventor points out, are built on one of two principles: either the alternating expansion and contraction of a rubber "boot" along the surfaces involved, or the application of engine exhaust or other source of heat. Simpler, lighter and less costly, he claims, is his method of installing cylinders along leading edges, in wing slots and at other critical places. These cylinders are slowly rotated, so that fresh surfaces are constantly being presented, and at the same time the already formed ice and slush are being scraped off against sharp blades.

*Science News Letter, July 24, 1943*

### MEDICINE

#### Study of Sprained Ankles Shows They Should Be Used

➤ SPRAINED ANKLES should not be pampered or spared, it appears from a report by Lieut. Commander Paul E. McMaster, U. S. Navy surgeon, of his experience with 500 cases of this condition at the U. S. Marine Corps Base Dispensary at San Diego, Calif.

"Immediate and continued active motion and use of a sprained ankle and foot almost irrespective of any local treatment definitely hastens recovery," he states (*Journal of the American Medical Association*, July 3).

Some of the patients were put to bed for a few days with cold and then hot applications. Others had their ankles taped and were told to keep off the affected foot as much as possible and to use crutches or a cane to spare it in necessary walking. Such patients were often disabled for periods from a few days to two or three weeks, in one case for eight weeks, and usually the ankles remained swollen, painful, stiff and tender and the trouble only gradually subsided.

By contrast, patients who were given no local treatment or only an elastic bandage or taping and immediately returned to duty and told to use and move the sprained ankle and foot had remarkably little disability lasting only a few days at most.

The most satisfactory aid to treatment of sprained ankles, Commander McMaster found, was injection of a local anesthetic into the injured ligaments. This completely eliminated the pain and thus enabled the patient to move and use the sprained ankle.

A person with a sprained ankle should of course see a physician as soon as possible. There may be a broken bone needing to be set, or a pulled muscle or some condition other than sprain requiring special attention. Underlying chronic arthritis of the ankle would complicate a sprain and delay recovery. But once your doctor has examined and treated your sprained ankle, you need not hesitate to go ahead and walk on it if he tells you to do so. If you don't follow that advice, it appears from Commander McMaster's report, you will only be slowing down your recovery.

*Science News Letter, July 24, 1943*

### INVENTION

#### Flooring Made Sparkproof By Use of Flat Metal Studs

➤ SPARKPROOF flooring has come very widely into use now that a considerable proportion of our industrial acreage is devoted to the handling of powder and other extremely inflammable or explosive substances. A kind of rubber matting that conducts instead of insulating has been much favored for this; it is impregnated with materials that give it this property.

This rubber is expensive at any time, and at present of course is hard to get at any price. For this reason, W. W. Donelson of Boston has devised a two-layered floor covering, the lower layer consisting of a very thin coating of conductive rubber, properly grounded, and the upper of a more conventional material like linoleum or asphalt in which are embedded flat studs of bronze or other non-ferrous metal, at close intervals. These serve to conduct static charges from the shoes of workers, wheels of trucks and other objects on the floor down to the conducting layer.

Rights in Mr. Donelson's patent, No. 2,323,461, have been assigned to the Federal Flooring Corporation.

*Science News Letter, July 24, 1943*

### PHYSICS

#### Largest Prism Ever Made Cast for Telescope

➤ A HUGE optical glass disk, the largest prism ever made, measuring 26 inches in diameter and graduated in thickness from one and one-half inches to three and one-quarter inches, has been cast successfully at the plant of the Bausch & Lomb Company in Rochester. It is for use in the Burrell astronomical telescope at the Case School of Applied Science, Cleveland.

This big lump of optical glass, weighing 260 pounds, is reported to be not only the largest prism ever cast, but also one of the most perfect pieces ever produced. When ground and finished it will be used as a spectrographic wedge plate for a large camera-telescope now in the astronomical observatory at the Case School.

The Schmidt telescope in which this prism will be used is one of the largest of this type in the world. It has a 24-inch lens and a 36-inch reflecting mirror. It has a sharp definition over a wide field and great speed, which enables it to photograph many distant stars in a short period of time.

This large prism will separate light from the stars into spectrum lines, by means of which astronomers determine the nature of the radiations, surface temperatures, stellar motion and velocity, and the mass and density of stars.

*Science News Letter, July 24, 1943*

### AGRICULTURE

#### Fertilizer In Furrow Bottom Increases Corn Yield

➤ CORN YIELDS in bad years, when the weather is either too wet or too dry, can be materially increased by putting commercial fertilizer in the bottom of the furrow as the field is plowed, instead of spreading it broadcast as is now the practice. This discovery was made by agricultural engineers at the Indiana State College of Agriculture in Lafayette (*Agricultural Engineering*, May).

The problem, it is explained, was to get into place for most efficient use the second, or "sustaining" application of fertilizer. The "starting" fertilizer is already placed in strips at the right distance from the seed as planted. A mechanical attachment for use with plows has been developed, which drops the fertilizer at properly spaced intervals in every second furrow.

*Science News Letter, July 24, 1943*

MEDICINE

# Nerve Banks Next?

Bits of bones, tendons and nerves in assorted sizes may some day be held in reserve for the surgeon just as the life-saving blood banks are used today.

By JANE STAFFORD

➤ JUST OVER the medical horizon appears the prospect of a new group of banks, coming to take their place beside the lifesaving blood banks, on which surgeons patching up men wounded in battle or serious accidents can some day draw.

These prospective banks will be made up of bits of nerves, bones and tendons in assorted sizes to fill the demands for spare parts to replace those lost through injury or damaged by disease. The tendon and bone banks are still in the realm of scientific speculation, though forward-looking surgeons believe them a possibility. The nerve banks have reached the rat, cat and monkey stage of laboratory development.

Even so, the jump to banks of human nerves is still pretty far in the future, warns Dr. Paul Weiss, University of Chicago zoologist who, with Dr. A. Cecil Taylor, has developed the experimental nerve bank for laboratory animals.

Today's patients with nerve injuries or nerve-destroying diseases cannot hope to have an order for a new nerve filled at such a bank. There is a chance, however, that before the war is over, nerve banks might be established for those wounded in battle.

Many of you have seen blood banks or pictures of them—rows of bottles of blood or of plasma or of vacuum bottles with a little dried plasma at the bottom. At Dr. Weiss' laboratory at the University of Chicago, I saw the animal nerve bank he is working on now.

## Few Glass Jars

It consists of a few glass jars in a refrigerator. In each jar are small glass tubes sealed at both ends. Inside each tube are a few bits of chalky-looking bent rods, a little thicker than pencil lead and about a quarter to a half inch long. Those chalky bits are frozen, dried nerves from rats or cats or monkeys.

When these chalky bits are rehydrated and grafted by a special technic into gaps of nerves in animals of the same

species, they heal and promote regeneration much as live nerves do. The result is a normally sensitive working nerve for the cat or rat or monkey.

The nerves were prepared for the nerve bank, somewhat as blood plasma is prepared for its banks, by freezing and drying in vacuum. The nerves for the bank are removed from the body under germ-free conditions. For human nerve banks, they would be taken from cadavers or from arms and legs that had to be amputated.

They are dropped into isopentane, immersed in liquid nitrogen at a temperature of 195 degrees Centigrade below freezing. The nerves freeze instantly and are then transferred to high vacuum maintained by mercury pumps for about one week of dehydration over phosphorus pentoxide at 40 degrees Centigrade below freezing. Finally, they are stored in sealed sterile containers.

When they are to be used to bridge a gap in a torn nerve, they are rehydrated in vapor at 40 degrees Centigrade below freezing or at room temperature in a special salt solution in vacuum. Then they are ready for grafting.

## Grafting Not New

Nerve grafting itself is not new. It was tried in the last war, but results were not too good and by 1920 British surgeons were advising it only as a last resort. Lack of a suitable supply of nerves of the right size was one difficulty.

Sometimes a piece of a minor nerve was taken from the patient's own body to bridge a gap in a more vital nerve. Efforts were also made to store or preserve nerves in oil, a special salt solution, alcohol or formaldehyde. None of these methods was universally successful, though surgeons have continued in the years between the wars to do some nerve grafting.

The supply problem will be solved if Dr. Weiss' banks of dried, frozen nerves can be adapted to human use. The second difficulty applies not only to nerve grafts but to the repair of cut nerves when there is no gap between the cut ends.

A nerve often looks like a piece of string which you would think could easily be joined when cut by simply taking a few stitches. Actually, of course, the nerve is not a piece of string and even though its cut ends may be neatly joined by surgical sutures, this does not insure that the nerve will once more perform its task of carrying impulses to or from the brain.

When a nerve is cut, the fiber on the far side of the cut dies, but the part between the cut and the brain or spinal cord remains alive and starts sending out new shoots or sprouts of tiny hair-like nerve fibers. If one of these fibers can find its way into the sheath or tube of the dead nerve on the other side of the cut, it can generally continue on its way to its terminal.

## Nerves Travel Blindly

Nerves, however, travel blindly. If much time elapses before a new fiber finds its way onto the old roadway, the road is likely to become blocked with other tissue cells that have grown over the nerve's road as the wound heals. This is especially likely to happen, of course, in the case of war wounds. Or the tiny sprout of new nerve fiber may have started in the wrong direction before the cut ends were sewed together.

Unless the surgeon operated under a microscope, he could hardly hope to see this and even with a microscope he might miss it, because the very tip of the newly growing fiber is probably ultramicroscopic in size.

Study of how these new nerve fibers grow has led Dr. Weiss to discovery of a way to greater success in joining the ends of cut nerves or of grafting a piece of nerve to bridge a gap between the ends. Instead of trying to sew the ends together he splices them with the aid of a sleeve made of a bit of artery.

So far, he has applied his method of nerve splicing only to cuts in animal nerves, but it seems likely that its benefits can be applied to joining cut human nerves also and, eventually, to aid in the use of grafts from nerve banks when and if these become established for humans.

The artery sleeve helps the newly growing nerve fiber to find its way partly by providing a tunnel for it in which nerve fluid collects, forming a superior medium for the growth of the nerve



**NERVE BANKER**—Dr. Paul Weiss, University of Chicago zoologist who has been experimenting with animals, hopes that some day banks similar to the blood banks may supply fragments for splicing torn nerves.

fiber and its sheath. The most important thing it does, Dr. Weiss believes, is to furnish a lengthwise pull on the fiber. Scientists have long speculated on how the blind nerve fibers ever find their way in the first place to the spot they are supposed to reach in the body. There have been theories that the region needing to be supplied by a nerve furnished some sort of chemical or electrical attraction that pulled the nerve in the right direction.

According to Dr. Weiss' theory, the growing nerve feels its way by contact with the surface along which it travels. The movement of the fibers and their direction are guided by surface forces, something as surface forces guide the spreading of oil on water. In the case of nerves, the surface forces guide by a lengthwise pull.

When anything upsets the molecular orientation of the surface over which the nerve travels, so that it does not exert this pull, the growing nerve fiber will wander about at random. An injury in which a nerve was cut might also cause disorientation of the surface so that the tiny tip of new nerve fiber could not find its correct road.

The artery sleeve helps remedy this situation because the blood clot inside it exerts a lengthwise pull as it shrinks

in size. This pull guides the nerve fiber over the cut and onto the old nerve pathway on the other side.

Dr. Weiss is not the only scientist who has been studying this problem of nerve growth and methods of repairing nerve injuries. British surgeons have developed a method of using plasma to "glue" the ends of cut nerves together, instead of sewing them, and of fixing nerve grafts in plasma, something as vegetables are set "in aspic," to make the soft, slippery fresh nerve grafts easier to handle as well as to make them stay in place without stitches.

#### CHEMISTRY

## Infra-Red Tests Fuels

A high speed analysis of complex chemicals can be made by shooting invisible rays through them, and the impurity of the chemical can also be estimated.

➤ **HIGH SPEED** analysis and impurity tests on certain organic chemicals, such as fuels and rubber compounds, can be made by shooting invisible infra-red rays through them.

Experiments reported to the meeting of the American Physical Society by R. S. Rasmussen, R. R. Brattain and O. Beeck of the Shell Development Company, Emeryville, Calif., revealed that the method can also help to show how the molecules of the chemical are constructed.

Infra-red rays—the heat rays of longer wave-length than ordinary light—cannot shoulder their way between all the atoms of the chemical tested. Some are blotted out; others pass through to form a pattern which scientists call an absorption spectrum.

Since the pattern is made up of heat rays, an apparatus is used to measure minute differences in heat along the spectrum. From this the scientists can interpret the identity of the chemical tested and roughly how much of various constituents is present.

Where characteristic bands of heat appear for specific chemical groups, the scientists reported that the method may also be used to help establish the structure of molecules. Sometimes the chemical mixtures are so complex that the many tell-tale bands are a jumble. To get around this the scientists separate the mixture into parts by distillation, then identify each one separately.

Workers at the Shell Development Company have applied the method to the

organic compounds called the higher isomeric paraffin and olefin hydrocarbons.

Early this year an American scientist, Dr. David Bodian, of Johns Hopkins University, reported still another way of closing gaps in cut nerves. He cuts loose the nerve sheath and underlying outer bundles of nerve fibers from one end of the cut nerve and slides this sleeve up to meet the other end, to which it is attached by stitches. New fibers growing from the living end of the nerve are protected by this sleeve from encroachment by non-nervous tissue and enabled to grow down their old pathways to their ultimate terminations.

*Science News Letter, July 24, 1943*

#### AGRICULTURE

## Hot-Weather Plowing Kills Worm, Saboteur of Crops

➤ A **LOW-LIFE** saboteur of war-vital tomato and other vegetable crops has been defeated with no more secret a weapon than an ordinary plow, by a method developed under the direction of Dr. G. H. Godfrey, Texas Experiment Station plant pathologist.

The villain in the piece was a species of threadworm or nematode, that infests plant roots, makes big, ugly knots and cuts down yield materially. It lives in the soil from crop to crop, ready to attack the next roots that come its way.

Dr. Godfrey found that by giving infested fields three extra plowings, with the thermometer near 100 degrees, he could turn up and thus kill off the greater part of the troublesome worms, which are very sensitive to heat and dryness. A comparison of yields from treated and untreated fields showed increased tomato yields worth more than \$100 an acre extra in favor of the treated soil, after deducting the increased cost of the additional plowings.

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America made 10,250,000,000 rounds of small-arms ammunition in 1942.



## ANATOMY

# Table of Ideal Weights

New figures for men are based on height and size of frame and not just on age. Six-footer with large frame may weigh between 169 and 185 pounds.

► A NEW TABLE of ideal weights for men appears, in response to popular demand, in the Metropolitan Life Insurance Company's *Statistical Bulletin*.

A similar table for women was published last October and ever since, it appears, the men have been clamoring for one.

The new table applies to all men 25 years or older. Weight tables in common use heretofore were based on average weights and showed a progressive increase with age. Such increases are undesirable from the standpoint of health and longevity.

Actually, of course, there is no single set of best or ideal weights for all men of a given height. Body build, including the bony structure, width of shoulders, length of trunk in relation to total height and muscular development result in weight variations. The Metropolitan statisticians have taken such factors into consideration and made their table for three classes of body build, small, medium and large, at the different heights.

So, whether you are 25 or 65, if you have a small frame and measure five feet nine inches, you should weigh, in ordinary street clothes, between 140 and 151 pounds. If you are of medium build and the same height, your weight should be between 149 and 160 pounds. With a large frame at the same height, the table allows you 157 to 170 pounds.

The six-footer of large frame is allowed between 169 and 185 pounds. Only those with big frames who are six feet three inches tall are allowed to reach the 200 mark. Their ideal weight, according to the table, is between 184 and 202 pounds.

Calling attention to the health dangers of overweight and the patriotic necessity of conserving food for our fighting men and the civilian populations of our allies abroad, the life insurance company's bulletin states:

"Overeating, which even in peacetime is an indefensible habit of self-indulgence, is little short of scandalous today."

*Science News Letter, July 24, 1943*

## ORNITHOLOGY

# Pigeons Aid the Allies

First news of the Tunisian victory was delivered by a homing pigeon. Pigeons are being used in all branches of our service.

► FIRST NEWS of the Tunisian victory was delivered to Headquarters via homing pigeon. "Yank," speeding over 98 miles in an hour and 52 minutes,

started on its trip around the world the news of the Allied triumph.

Pigeons are being used as a means of communication in all branches of our service. When a radio message might release valuable information to the enemy, or when the radio is out of commission, pigeons have faithfully brought the message through. The birds are apparently not bothered by the flash of artillery or the roar of an airplane.

Capsules containing the message that must be delivered are attached to the pigeon's leg. In the case of more lengthy messages, they are attached to the bird's back. Even in combat areas, 96 out of every 100 pigeons get through (*Audubon Magazine*, May-June).

The pigeon's home loft may be made in a movable vehicle which can be transported to the place where the message should be delivered. Birds raised in movable lofts are particularly valuable during time of war. Homing pigeons have been known to fly great distances, and "thousand mile birds" are not uncommon.

The British Coastal Command resumed the rescue pigeon service shortly before the war, and more recently the British Bomber Command adopted it. With a pigeon or two on board, the bomber crews have an extra feeling of security. Should they be forced down before their position can be given via radio, the bird can be relied upon to take home the news of their plight.

"Winkie," pet of the crew of an ill-fated Beaufort forced down at sea, broke out of her cage before a message could be attached. Her owner, when she reached home, reported to the crew's base airdrome that she had returned all wet and oilstained. Working on the pigeon's cruising speed and knowledge that she would not fly at night, the area of search was narrowed. Within twenty minutes the lost men were located.

*Science News Letter, July 24, 1943*

## AERONAUTICS

# Plastic Airplane Parts Prove Better Than Metal

► PLASTICS, performing the same functions as aluminum in certain parts of airplanes, save weight, cost less and in some ways are better than corresponding metal parts, declared W. I. Beach, chief engineer of North American Aviation, Inc., at the meeting of the American Society of Mechanical Engineers in San Francisco. "A method of treating thermosetting laminated material was discovered which contrary to the thermosetting concept permits forming of objects having simple and compound curvatures," he said.

"According to all definitions of phenol-formaldehyde plastics, the material when finally cured under an application of heat and pressure becomes infusible and insoluble," he continued. "This theory is erroneous in so far as it is applied to the phenolic laminated sheet material manufactured today. The fact that an apparent thermosetting product can be formed indicates that complete polymerization or cure has not taken place. This is borne out by an actual case wherein a test specimen was formed and formed twelve consecutive times."

*Science News Letter, July 24, 1943*

## Books

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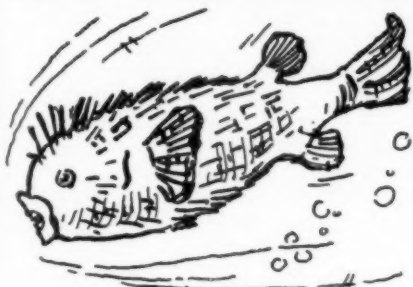
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ICHTHYOLOGY

# NATURE RAMBLINGS

by Frank Thone



## Caveat Captor

► FISH caught in South Sea waters, whether for sport or by necessitous air-men or seamen adrift on life rafts, are not always safe, warns a new publication of the Australian Council for Scientific and Industrial Research, prepared by G. P. Whitley, F. R. Z. S. A number of species are definitely poisonous and must never be eaten, several other kinds have venomous stings or barbs, and a few, notably sharks, sea eels and a close relative of our barracuda, viciously attack men in the water.

Some of the poisonous-fleshed species are not likely to be eaten except under near-starvation conditions. One group, the box fishes, have hard armor over their heads and fore parts of their bodies—and very little flesh inside once this tough case is cracked. Two other groups, the puffers and porcupine fishes, have a habit of blowing themselves up with air until they resemble small balloons with fins and tails; the puffers are known in Australia by the suggestive name of "toadoes."

However, there are several species that are very attractive in appearance and might well be cooked and eaten by incautious strangers. There is one known as the red bass, for example, that is as handsome a fish as an angler ever hauled in. Burgundy red underneath, sooty on its back, with a yellow area back of the mouth and over the gill-covers. Then there is the Chinaman fish, which besides being fine to look at puts up a game fight when hooked. One of the difficult things about these two fishes is that they can be eaten by some persons with impunity but are poisonous to others.

One of the oddest cases is that of the goatfish or red mullet, a fish of very

wide distribution. Of it, Mr. Whitley says, "The flesh is edible, indeed delicious, and provided feasts for epicures in Roman times, but it has been found in Hawaii that eating the brain is followed by delirium and mental paralysis."

No fish is known to be able to inflict a venomous bite, but there are plenty armed with external spines or barbs, that apparently secrete poisons to make the wounds they inflict much more serious. Among these are sting-rays, catfishes, scorpion fishes and a number of others. There are also a few species, such as the aptly-named surgeon fish, that have razor-sharp little blades near their tails, which they can thrust forward when struggling against capture, and inflict severe, though unpoisoned, jabs and slashes.

*Science News Letter, July 24, 1943*

## CHEMISTRY

### Coffee Freshness Depends On Sealing Oxygen Out

► FRESH COFFEE flavor depends on shutting moisture and air out of the package rather than sealing aroma in, state A. Cornwell Shuman and Lucius W. Elder, Jr., of General Foods Corporation (*Industrial and Engineering Chemistry*, July).

In a series of experiments, the aroma of freshly ground coffee was swept away continuously by a stream of nitrogen gas. After nearly eight weeks of such treat-

ment, expert tasters pronounced the flavor unimpaired. Hence, no flavor can escape into the air space of a sealed container while it is sitting on the grocer's shelf, the scientists conclude.

Next the experimenters shot a stream of moist gas through the coffee for about seven weeks. Results were nearly the same: only a slight staleness developed and that during the first seven to nine days of treatment. Moisture without the continuous breeze brought on staleness more rapidly.

Oxygen of the air was confirmed as being the real villain of the piece. Small amounts of oxygen and water sealed into the package with the coffee made the coffee stale most quickly.

From the experiments may well come a method for salvaging stale coffee—no small feat in these days of limited supplies. Coffee exposed to oxygen for nearly three weeks was brought back to comparative freshness by sweeping inert gas through the coffee for a week. At least part of stale flavor must be due to compounds which can be evaporated off, the researchers report. But after the coffee was 32 days old, oxidation had gone so far that the gas treatment caused no improvement.

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*Rabies* has been eliminated or kept out of Great Britain, Sweden, Switzerland, Australia and Hawaii; the United States has some 9,000 cases a year, mostly in dogs, which could be prevented by proper measures.

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## AERONAUTICS

# Postwar Transports

**Air transport industry faces critical period in decade following the war. Diesel engines may be used in long-range planes, and all will have radar.**

► THE MOST critical period to be faced by the air transport industry will be the first decade following the end of the war, declared Charles Froesch, chief engineer of Eastern Air Lines, Inc., speaking at the meeting of the Society of Automotive Engineers in New York.

"It is safe to say, at the outset, that the day of transport airplane standardization, as we have known it for the past seven years . . . is over," he said, "for as we grow we must provide a public service ranging from local passenger service operation to long range passenger service, as well as air cargo facilities to the shipper of merchandise requiring speed of movement."

Five distinct types of airplanes will be required for these purposes.

Three successive periods of development are expected during the ten-year period. They are the transition period, changing from war to commercial activities, an intermediate period of readjustment and expansion, and a development era of efficient large-scale operation of improved large and small planes, and ground handling which will establish the air transport industry as big business.

"Any transport plane must be conceived around its passenger cabin and cargo compartment for passenger operation, or its cargo compartment if especially designed for air cargo service," Mr. Froesch stated.

"Every part of the airplane should be designed for utility. No operating function must be either sacrificed or compromised, yet the designer must continually bear in mind simplicity of design."

The power plant is of particular im-

portance. Accessibility for overhaul without too great a loss of time is an essential. Diesel engines, he suggested, may some day be used in transcontinental and other long-range passenger and cargo planes.

"Fuel cost represents today approximately 12% of all direct flight costs and therefore any possible reduction permitted by the substitution of a cheaper fuel is worth investigating," he stated.

"In view of amazing advances in radio, it is difficult at this time to outline any specifications, except to say that modifications of the much discussed radar should give us an excellent postwar instrument landing system and perhaps provide what might be virtually called a block system of the air. Postwar transport radio equipment will undoubtedly include equipment for landing, automatic compass, communications equipment, and ultra high frequency radio range receivers."

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## RESOURCES

## Iron Printing Plates May Replace Copper and Nickel

► IRON printing plates, releasing the copper and nickel now used for service on the war front, have been made possible through research at the Battelle Memorial Institute in Columbus, Ohio. The new process, just announced, represents the completion of two years of experimentation, in which 125 different iron-plating solutions were tried out.

Battelle engineers have developed a solution which will produce deposits of electrolytic iron satisfactory for normal

electrotyping operations and for the hard surfacing of stereotypes.

Copper and nickel can be reduced 50% to 70% by processes well tested commercially, and eliminated entirely by a process that works successfully in the laboratory and which is now undergoing commercial production tests, it is claimed.

Ferrous sulfate, ferrous chloride and ammonium chloride, in definite proportions, are the essential components of the iron plating electrolytic bath. Iron anodes are used, the electrotype mold itself serving as the cathode. The iron can be plated on treated lead molds, or on wax molds previously oxidized with copper or silvered with a silver spray apparatus.

To be successful, the bath must be prepared carefully according to specifications, but the process is not too technical for commercial practice. The investigation was sponsored by Printing Plates Research, Inc., a non-profit corporation.

*Science News Letter, July 24, 1943*

## ENGINEERING

## Shooting Electrons Aid Attack on Rust, Corrosion

► SHOOTING BILLIONS of electron bullets per second, the electronic diffraction camera is being used for a new scientific attack on rust and corrosion.

These silent saboteurs of metal war equipment are being investigated at the Westinghouse Research Laboratories by Dr. Earl A. Gulbransen through studies of the atomic structure of coatings that "grow" on steel, aluminum and copper when these metals are exposed to air or corrosive chemicals.

"Just as some types of bacteria are beneficial to human beings," Dr. Gulbransen explained, "some of these oxide coatings protect the metal underneath them. Others, of course, like rust, are harmful. With this electronic camera, we are testing new theories as to how these coatings are formed."

The camera bounces electrons off a highly polished button of aluminum or steel on which an oxide coating is being built up. Electrons ricochet off different faces of the molecules of the coating, and strike a strip of photographic film. A design is formed on the film from which atomic structure can be interpreted.

Such research points the way toward development of longer-wearing bearings and cylinders for plane and auto engines, better tin cans and cheaper stainless steel.

*Science News Letter, July 24, 1943*

SCIENCE NEWS

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## • New Machines And Gadgets •

✿ **"BOMB BOTTLERS"** have been developed for filling practice bombs five at a time with 90 pounds of hot, dry sand. The machine does the work of 10 three-man teams of soldiers, releasing them for other duty. Thousands of practice bombs are prepared daily by the machine which resembles a giant soda pop bottler.

Science News Letter, July 24, 1943

✿ **HUGE WOODEN** trailers for ground transportation of gliders are being used experimentally. Two units carry a glider: one for the wings and one for the fuselage.

Science News Letter, July 24, 1943

✿ **MORE UNIFORM,** accurate and less costly production of small tools is expected from a newly designed, electric salt bath furnace. Heat treating tools of extreme length, such as saw blades, is now possible.

Science News Letter, July 24, 1943

✿ **LIGHTHOUSE** of health, a new type of ultra-violet ray unit, has just been installed. Improvements have reduced operation costs to make regular irradiation of large numbers of war workers practical. Standing in a circle around the unit, 15 persons can simultaneously receive ultra-violet applications.

Science News Letter, July 24, 1943

✿ **ELECTRONIC** heaters, such as the one shown in the picture, are now being

used in metal industries to perform hardening, brazing and soldering operations in seconds instead of minutes.

Science News Letter, July 24, 1943

✿ **A RECOIL DAMPING** device for aircraft machine guns is used by gunners on all types of bombing planes. The device is a portable, lightweight cradle consisting of two steel tubes and a hydraulic absorption unit. Its use permits more accurate shooting.

Science News Letter, July 24, 1943

✿ **A BLACKOUT** venetian blind has been patented. When properly installed, a flick of a cord will fully close the slats and prevent any light from seeping into the outer darkness.

Science News Letter, July 24, 1943

✿ **CARBURETOR** and supercharger diaphragms of warplanes are now made of a synthetic rubber and nylon. Compared to previous diaphragms they are said to be eight times as strong and have a flex life nine times as long. The product withstands effects of high-octane and aromatic fuels and operates efficiently at temperatures from 175 above to 65 below zero.

Science News Letter, July 24, 1943

✿ **MAILING PICTURES** to men and women in service, as well as to distant civilian friends, is simplified by a combination letter and snapshot album now on the market. The recipient can use the inexpensive unit as a handy pocket album.

Science News Letter, July 24, 1943

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 166.

### PHYSIOLOGY-PSYCHOLOGY

## School of Alcohol Studies Opens at Yale University

➤ **THE SCHOOL** of Alcohol Studies in Yale University, first formal school of its kind in the academic history of the United States, has just opened in New Haven, Conn.

Those who have to deal with the victims and potential victims of "Demon Rum" make up the student body. They include school principals and teachers, social workers, court probation officers and clergymen.

The faculty of the school, under the directorship of Dr. E. M. Jellinek of

Yale, includes physicians, physiologists, psychologists and psychiatrists who will explain how alcohol affects the human body and mind, and sociologists, jurists and clergymen who will report their findings on the role of alcohol in the human social structure.

Science News Letter, July 24, 1943

### CHEMISTRY

## Synthetic Lubricants Show What Makes Good Oil Good

➤ **THE PROBLEM** of what makes a lubricating oil good or bad is being attacked in a new way by Robert W. Schiessler and other chemists at Pennsylvania State College.

They are making their own lubricants, building them up synthetically from pure hydrocarbons of known molecular structure, so that when the oil is made they know what's in it and what its molecules are like. Then if the oil is good they know what made it good, and if it is poor they know what made it that way.

Natural lubricating oils are for the most part mixtures of hydrocarbons of high molecular weight which cannot easily be separated. This makes it difficult and often impossible to determine what each component contributes to the lubricating qualities of the oil. Putting the oils together instead of taking them apart promises to solve this problem.

Science News Letter, July 24, 1943

### AERONAUTICS

## Finishing Touches Put on New Type Convoy Balloons

See Front Cover

➤ **A NEW** type of convoy balloon is being turned out by the B. F. Goodrich plant at Akron, Ohio. These balloons are 33 feet long, with a diameter of 13 feet and a capacity of 3,000 cubic feet of gas.

The illustration on the front cover of this week's SCIENCE NEWS LETTER shows women workers putting the finishing touches on these balloons which are destined to hover protectively over war-bound ships.

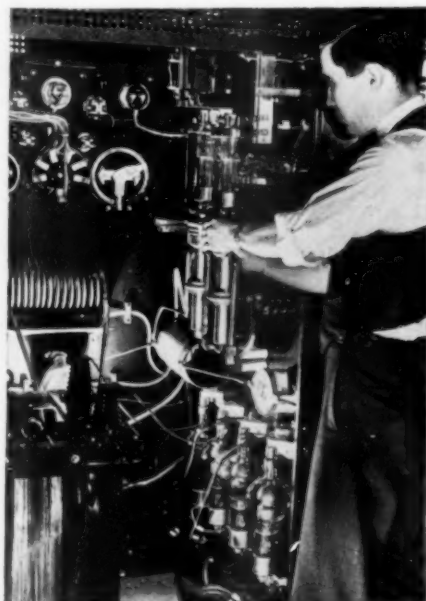
Science News Letter, July 24, 1943

## ● RADIO

Saturday, July 31, 1:30 p.m., EWT

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Howard L. Alt of Northwestern University Medical School in Chicago will speak on "Use of Red Blood Cells for the Treatment of Anemia."



# First Glances at New Books

► **REPAIR MEN** will find a wealth of information in **RADIO TROUBLESHOOTER'S HANDBOOK** by Alfred A. Ghirardi (*Radio & Technical Pub. Co.*, \$5). Much new material has been added in this third revision to aid the fix-it shops which have become glutted with broken-down sets since war made new models as scarce as the dodo.

*Science News Letter, July 24, 1943*

► **BUTTON-PUSHING** moderns who make electricity do their bidding, perhaps little understand the power they control. Joseph R. Lunt and William T. Wyman write simply in **ELECTRICITY FOR EVERYONE** (*Macmillan*, \$3.25) to give a better understanding of the appliances commonly used. Home experiments are included. The story proceeds to explanations of such seeming miracles as the electric eye, radio and television.

*Science News Letter, July 24, 1943*

► **THE TERM "BIOTIC"** province or region is not particularly familiar to the ordinary layman. A biotic province is a large geographic area with similar plant and animal life, climate, physiography and soils. **THE BIOTIC PROVINCES OF NORTH AMERICA**, by Lee R. Dice, (*Univ. of Michigan Press*, \$1.75) includes a biotic map of the continent and describes 29 biotic provinces.

*Science News Letter, July 24, 1943*

► **THE UNION** of South Africa, by Lewis Snowden, (*Doubleday-Doran*, \$3) covers the history, geography and peoples of this interesting country with its modern cities, rural developments, native blacks, progressive whites, and its General Jan Christian Smuts. It is a valuable background study for those who would know about the southern part of the African continent.

*Science News Letter, July 24, 1943*

► **GEOGRAPHY** of Australia from the "useless" desert interior, through the semi-arid, the pastoral and the agricultural concentric encircling areas, to the coast, is interestingly described by Griffith Taylor in **AUSTRALIA** (*Dutton*, \$6). It is a scientific study suitable for colleges and universities.

*Science News Letter, July 24, 1943*

► **HOW THE FACE** of the earth has come to look as it does today is told by

Norman E. A. Hinds in **GEOMORPHOLOGY: THE EVOLUTION OF LANDSCAPE** (*Prentice-Hall*, \$5). It tells also of some of the facial changes of the past ages. It is prepared for students and general readers uninitiated in earth lore. It is beautifully illustrated with many excellent reproductions of photographs taken for the most part within the United States.

*Science News Letter, July 24, 1943*

► **NURSE'S AIDES** and their teachers will welcome this comprehensive, clearly written and clearly illustrated manual, **A HANDBOOK FOR NURSE'S AIDES**, by Katherine Orbison (*Devin-Adair*, \$2). Since many of the simple nursing procedures described must often be practiced by mothers of small children, the book should also be useful to this group.

*Science News Letter, July 24, 1943*

## Just Off the Press

**ALASKA: America's Continental Frontier Outpost**—Ernest P. Walker—*Smithsonian Institution*, 57 p., illus., free upon direct application to Smithsonian Institution. (Smithsonian Institution War Background Studies: Number 13.)

**CHINA'S HEALTH PROBLEMS**—Szeming Sze—*Chinese Medical Assn.*, 60 p., \$1.

**DOCTORS AWEIGH: The Story of The United States Navy Medical Corps in Action**—Charles M. Oman—*Doubleday Doran*, 231 p., illus., \$2.50.

**Eocene FORAMINIFERA FROM THE TYPE LODO FORMATION, FRESNO COUNTY, CALIFORNIA**—Lois T. Martin—*Stanford Univ. Press*, 35 p., V plates, 75c, paper. Univ. series, Geological Sciences, Vol. III, No. 3.

**GEOLOGIC FORMATIONS AND ECONOMIC DEVELOPMENT OF THE OIL AND GAS FIELDS OF CALIFORNIA**—Olaf P. Jenkins—*Calif. State Printing Office*, 774 p., illus., \$4, paper. In four parts, including outline geologic map showing oil and gas fields, and drilled areas. Pt. I, Development of the Industry; Pt. II, Geology of Calif. and the Occurrence of Oil and Gas; Pt. III, Descriptions of Individual Oil and Gas Fields; Pt. IV, Glossaries, bibliography, and index. Bulletin 118. 126 geologists contributed to this treatise.

**HOW TO TAKE CARE OF YOUR CLOTHES**—*Dan River Mills*, 16 p., illus. Free upon request to publisher, 40 Worth St., New York 13, N. Y.

**INDUSTRIAL RADIOLOGY AND RELATED PHENOMENA**—H. M. Muncheryan—*Aircraft X-Ray Laboratories*, 539 p., illus., \$7.50. First ed. Comprehensive book, covering X-rays, gamma rays, physical metallurgy, and magnetic analysis.

**INORGANIC QUALITATIVE ANALYSIS: Semi-Micro Technique**—Harold A. Fales and Frederic Kenny—*D. Appleton-Century*, 237 p., illus., \$2.65.

**INSIDE THE F.B.I.**—John J. Floherty—*Lippincott*, 192 p., illus., \$2. Foreword by J. Edgar Hoover.

**LATIN AMERICA**—*Americana Corp.*, 127 p., illus., \$2, paper. Based on the latest edition of the *Encyclopedia Americana*.

**MAN'S UNKNOWN ANCESTORS: The Story of Prehistoric Man**—Raymond W. Murray—*Bruce Pub. Co.*, 384 p., illus., \$3.50.

**MANUAL FOR INSTRUCTION IN MILITARY MAPS AND AERIAL PHOTOGRAPHS**—Norman F. MacLean and Everett C. Olson—*Harper*, 137 p., 5 plates, \$1.75. Harper's geoscience series.

**MARCONI: Pioneer of Radio**—Douglas Coe—*Messner*, 272 p., illus., \$2.50.

**MEAT SAVING RECIPES**—Natalie K. Fitch and Mary Agnes Davis—*Teachers College, Columbia Univ.*, 35 p., 30c.

**REHABILITATION OF THE WAR INJURED: A Symposium**—William Brown Doherty and Dagobert D. Runes, ed.—*Philosophical Library*, 684 p., illus., \$10.

**THE SPIRIT OF ENTERPRISE**—Edgar M. Quency—*Scribner's*, 267 p., \$2. A statement of the arguments for the competitive system without strong government control.

**WAR AND CHILDREN**—Anna Freud and Dorothy T. Burlingham—*Medical War Books*, 191 p., \$4.

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